Report

Dsp (soc)

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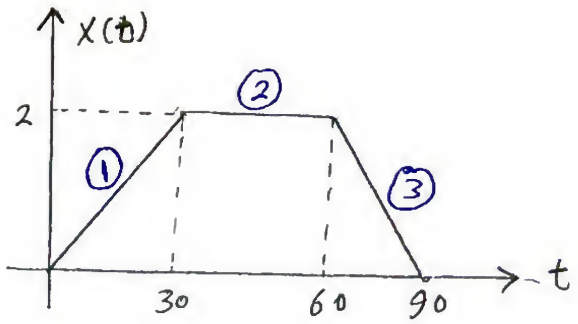
Sec 2

Find $X(z)$ For $T = 1$



[1] $x_1(n) = \sum_{k=1}^{30} \frac{1}{15} n\ \delta(n-k)$

$X_1(z) = \sum_{k=1}^{30} \frac{1}{15} \left[-z \frac{d}{dz} (z^{-k}) \right]$

$= \sum_{k=1}^{30} \frac{1}{15} \left[kz \cdot z^{-k-1} \right]$

$= \sum_{k=1}^{30} \frac{1}{15} \left[k z^{-k} \right]$

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[2] $x_2(n) = \sum_{k=31}^{60} 2\ \delta(n-k)$

$X_2(z) = \sum_{k=31}^{60} 2 z^{-k}$

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[3] $x_3(n) = \sum_{k=61}^{90} \frac{-1}{15} (n-90)\ \delta(n-k)$

$= \sum_{k=61}^{90} \frac{-1}{15} n\ \delta(n-k) + \sum_{k=61}^{90} 6\ \delta(n-k)$ → like [1] $\leq \frac{1}{15} n\ \delta(n-k)$

$X_3(z) = \sum_{k=61}^{90} \frac{-1}{15} \left[k z^{-k} \right] + \sum_{k=61}^{90} 6 z^{-k}$

$x(n) = x_1(n) + x_2(n) + x_3(n)$

$X(z) = X_1(z) + X_2(z) + X_3(z)$

$X(z) = \sum_{k=1}^{30} \frac{1}{15} \left[k z^{-k} \right] + \sum_{k=31}^{60} 2 \left[z^{-k} \right] + \sum_{k=61}^{90} \frac{1}{15} \left[k z^{-k} \right] + \sum_{k=61}^{90} 6 \left[z^{-k} \right]$